CLAIMS

1. A video encoding method for selecting the mode of a current macroblock of an inter-coded frame, the method comprising at least one of:

checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes;

checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock;

checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes; and

adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

2. A video encoding method as defined in Claim 1, the method comprising checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes.

3. A video encoding method as defined in Claim 1 wherein said first modes comprise the quadratic modes of SKIP, 16x16, 8x8, and 4x4.

4. A video encoding method as defined in Claim 1, further comprising checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock.

5. A video encoding method as defined in Claim 1, further comprising checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes.

6. A video encoding method as defined in Claim 1, further comprising adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

7. A video encoding method as defined in Claim 1, further comprising:

initially performing motion estimation only for a subset of the possible block sizes; and

using the motion information to determine if other motion estimation or complexity measures should be performed for other block sizes.

8. A video encoding method as defined in Claim 7 wherein said first modes are checked first and their motion information is used to decide if other modes needs to be checked.

9. A video encoding method as defined in Claim 1 wherein spatial/temporal neighboring macroblock and block partition information is used to decide the subset of possible block sizes or inter/intra modes that need to be checked.

10. A video encoding method as defined in Claim 1, further comprising:

initially performing mode checking for a subset of both inter modes and intra modes;

calculating a complexity measure responsive to the mode checking; and

using the complexity measure to determine if other inter modes and intra modes should be performed.

11. A video encoding method as defined in Claim 6 wherein the early stop criteria are based on adaptive thresholding to stop checking other inter or intra modes.

12. A video encoding method as defined in Claim 1 wherein early termination takes place if spatially or/and temporally neighboring macroblocks have a

specific relationship with the motion information of the current macroblock after examining a specific mode.

13. A video encoder for encoding video signal data and selecting the mode of a current macroblock of an inter-coded frame, the encoder comprising at least one of:

first means for checking the first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes;

macroblock means for checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock;

subset means for checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes; and

stopping means for adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

14. A video encoder as defined in Claim 13, the encoder comprising first-checking means for checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes.

15. A video encoder as defined in Claim 13 wherein said first modes comprise the quadratic modes of SKIP, 16x16, 8x8, and 4x4.

16. A video encoder as defined in Claim 13, further comprising neighbor-checking means for checking the macroblock mode of at least one neighboring

macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock.

17. A video encoder as defined in Claim 13, further comprising intra-checking means for checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes.

18. A video encoder as defined in Claim 13, further comprising thresholding means for adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

19. A video encoder as defined in Claim 13, further comprising:

motion-estimation means for initially performing motion estimation only for a subset of the possible block sizes; and

determination means for using the motion information to determine if other motion estimation or complexity measures should be performed for other block sizes.

20. A video encoder as defined in Claim 19 wherein said first modes are checked first and their motion information is used to decide if other modes needs to be checked.

21. A video encoder as defined in Claim 13 wherein spatial/temporal neighboring macroblock and block partition information is used to decide the subset of possible block sizes or inter/intra modes that need to be checked.

22. A video encoder as defined in Claim 13, further comprising:

inter/intra checking means for initially performing mode checking for a subset of both inter modes and intra modes;

complexity means for calculating a complexity measure responsive to the mode checking; and

inter/intra determination means for using the complexity measure to determine if other inter modes and intra modes should be performed.

23. A video encoder as defined in Claim 18 wherein the early stop criteria are based on adaptive thresholding to stop checking other inter or intra modes.

24. A video encoder as defined in Claim 13 wherein early termination takes place if spatially or/and temporally neighboring macroblocks have a specific relationship with the motion information of the current macroblock after examining a specific mode.

25. A digital videodisc encoded with signal data comprising a plurality of block transform coefficients, the signal data resulting from at least one of:

checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes;

checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock;

checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes; and

adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

26. A digital video disk as defined in Claim 25, the signal data resulting from checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes.

27. A digital video disk as defined in Claim 25 wherein said first modes comprise the quadratic modes of SKIP, 16x16, 8x8, and 4x4.

28. A digital video disk as defined in Claim 25, the signal data further resulting from checking the macroblock mode of at least one neighboring macroblock,

and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock.

29. A digital video disk as defined in Claim 25, the signal data further resulting from checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes.

30. A digital video disk as defined in Claim 25, the signal data further resulting from adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met.

31. A digital video disk as defined in Claim 25, the signal data further resulting from:

initially performing motion estimation only for a subset of the possible block sizes; and

using the motion information to determine if other motion estimation or complexity measures should be performed for other block sizes.

32. A digital video disk as defined in Claim 31 wherein said first modes are checked first and their motion information is used to decide if other modes needs to be checked.

33. A digital video disk as defined in Claim 25 wherein spatial/temporal neighboring macroblock and block partition information is used to decide the subset of possible block sizes or inter/intra modes that need to be checked.

34. A digital video disk as defined in Claim 25, the signal data further resulting from:

initially performing mode checking for a subset of both inter modes and intra modes;

calculating a complexity measure responsive to the mode checking; and

using the complexity measure to determine if other inter modes and intra modes should be performed.

35. A digital video disk as defined in Claim 30 wherein the early stop criteria are based on adaptive thresholding to stop checking other inter or intra modes.

36. A digital video disk as defined in Claim 25 wherein early termination takes place if spatially or/and temporally neighboring macroblocks have a specific relationship with the motion information of the current macroblock after examining a specific mode.

37. A video encoding method for selecting the encoding mode of a macroblock of an inter-coded frame, the method comprising:

selecting a subset of macroblock modes for encoding;

comparing said subset of macroblock modes for coding efficiency; and

selecting a mode having favorable coding efficiency, responsive to said step of comparing modes.